REMARKS

By the amendment, claim 1 is revised to place this application in condition for allowance. Currently, claims 1-4 are before the Examiner for consideration on their merits.

In the Office Action, claims 1-4 stand rejected under 35 U.S.C. § 103(a) based on JP 5-202447 to Eiji et al. (Eiji). In this rejection, the Examiner has taken the position that even though an overlap does not exist with respect to the carbon amount of Eiji, i.e., a minimum of 0.26% and the claimed value of 0.25%, the values are sufficiently close to establish obviousness. The Examiner also alleged that Eiji met the claimed value of the carbon equivalence equation, and that the oxygen content in Eiji, although not expressed, still met that which is claimed.

In response to the Office Action, claim 1 has been revised to narrow the upper limit of carbon from 0.25% to 0.20%. Support for this amendment may be found on page 5, line 3. Claim 1 is also now defined as a seamless tube with a bainite-based structure. Support for this limitation can be found page 3, lines 15-24.

In light of the amendments to claim 1, the rejection based on Eiji is respectfully traversed. The rejection is addressed by the following headings, INVENTION, ARGUMENTS, and SUMMARY.

INVENTION

The present invention is aimed at solving the problems of prior art non-heat treated seamless tubes. Non-heat treated seamless tubes have been developed as an answer to the increased costs associated with heat treated tubes. However, the non-heat treated seamless tubes are not without their disadvantages. That is, it is difficult to obtain the combination of strength and toughness required by users of the tubes. Also, cracking at welded areas is quite common amongst the prior art tubes.

The invention seeks to alleviate the problems with non-heat treated seamless tubes, and does so by adjusting the composition in such a way that high strength and high toughness are combined. The inventive tube also has excellent resistance to cracking at a welding part. This aims are achieved without restricting the degree of manufacturing processing and manufacturing temperature.

In attaining the goals of the invention, a number of factors are involved as follows:

1) carbon is lowered to a maximum of 0.20%;

2) manganese, chromium, and vanadium contents are controlled (control of the amounts of these elements is critical in order to compensate for the loss of strength due to reduction in carbon content);

3) the carbon equivalent is controlled in a specific range of between 0.60 and 0.85; and

4) a bainite-based structure for the seamless tube is employed.

These features are all found in claim 1, wherein carbon has an upper limit of 0.20%, specific amounts of chromium, vanadium, and manganese are specified, a bainite-based structure is set forth, and a carbon equivalent range is specified.

ARGUMENTS

It is contended that either Eiji fails to establish a *prima facie* case of obviousness, or any obviousness rejection based on Eiji is rebutted by the comparative showing set forth in the specification.

Eiji is one of the numerous prior art publications discussed on pages 1 and 2 of the specification. As this description indicates, Eiji is in the class of medium carbon group materials that suffers from poor toughness and weld cracking.

When viewing the Tables on page 3 of Eiji, it is quite clear that the carbon contents of the exemplified alloys are all much greater than 0.20%. The one identified by the Examiner has 0.25% carbon. However and of equal significance to the arguments in favor of patentability, Example 6 of the page 3 Table of Eiji has 0.19% carbon, shows a carbon equivalent outside the claimed range, and lacks the claimed level of chromium.

Eiji is also distinguishable from the invention in that there is no mention of a bainite-based structure.

Since Eiji admittedly does not teach all of the features of claim 1, as amended, the issue of obviousness becomes whether it would be obvious to lower the carbon content to that which is claimed and use the claimed levels of Cr, Mn, and V, and specify a bainite-based structure. It is respectfully contended that there

is no reason for altering the carbon content of Eiji, particularly since such would change the entire make-up of the Eiji "medium carbon group" alloy.

Moreover, even if one were taught to use 0.19% carbon as shown in Alloy No. 6, this alloy lacks the claimed amount of chromium, and just lowering the carbon level still does not get one to the invention. As set forth above, the invention involves the control of carbon, chromium, manganese, and vanadium, carbon equivalence and use of the bainite-based structure. Again, merely altering the carbon of Eiji does not lead to the invention.

Any assertion that the modifications described above would be obvious can only be based on Applicant's disclosure which is tantamount to the use of hindsight to make the rejection. Therefore, the rejection of claim 1 is misplaced and should be withdrawn.

Even, if the Examiner were to allege that Eiji somehow presents a *prima facie* case of obviousness against claim 1, the comparative evidence of the specification demonstrates that the invention merits patentability. Referring to Table 1 on page 10 of the application, a number of low carbon alloys are tested as comparative examples, see Nos. 24-28. What this shows is that just having low carbon is insufficient to achieve high strength and high toughness. For example, Comparative No. 28 falls within the claimed range but lacks the claimed carbon equivalent.

The teachings of Eiji are also informative on this issue. Referring again to test no. 6 of Eiji, this test also shows the criticality of the invention by the failure of a low carbon alloy to function effectively, see the low strengths shown on the table on page 6 of Eiji and the fact that the carbon equivalence for this test number is outside the claimed range.

Referring again to the comparative evidence of the instant specification, Test Nos. 1-21 show that only with the claimed ranges of carbon, chromium, vanadium, manganese, and carbon equivalence are the objectives of the invention met.

Based on the comparative evidence discussed above, it is contended that the combination of Cr, C, V, Mn, and carbon equivalent values are essential to attain an improved non-heat treated seamless tube defined by claim 1. This evidence rebuts any allegation that Eiji obviates claim 1, and the rejection should be withdrawn for these reasons.

Claims 2-4 are also in condition for allowance by reason of their dependency on claim 1.

SUMMARY

By the amendments and arguments set forth above, it is respectfully contended that Eiji either fails to establish a *prima facie* case of obviousness against claim 1, or any such case is effectively rebutted by the evidence of record. Consequently, claim 1 and its dependent claims 2-4 are now in condition for allowance.

Accordingly, the Examiner is respectfully requested to examine this application in light of this Amendment and pass claims 1-4 onto issuance.

If the Examiner believes that an interview with Applicant's attorney would be helpful in expediting prosecution of this application, the Examiner is invited to telephone the undersigned at 202-835-1753.

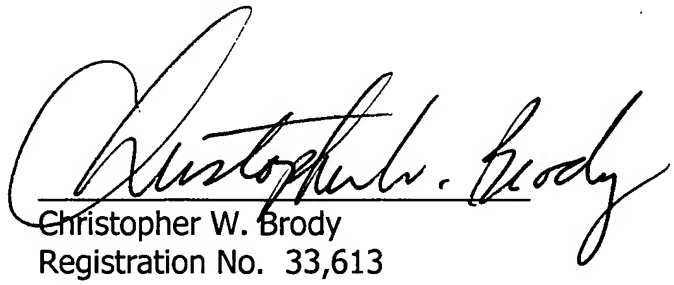
The above constitutes a complete response to all issues raised in the Office Action dated June 6, 2005.

Again, reconsideration and allowance of this application is respectfully requested.

Please charge any fee deficiency or credit any overpayment to Deposit Account No. 50-1088.

Respectfully submitted,

CLARK & BRODY



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